

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 14 OCT 2004

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Applicant's or agent's file reference 017750-811		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/25876	International filing date (day/month/year) 20 August 2003 (20.08.2003)	Priority date (day/month/year) 20 August 2002 (20.08.2002)	
International Patent Classification (IPC) or national classification and IPC IPC(7): H04B 1/38, 5/00 and US Cl.: 455/73, 41.2, 42, 260, 313, 67.11			
Applicant LOCKHEED MARTIN CORPORATION			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>8</u> sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 22 March 2004 (22.03.2004)		Date of completion of this report 27 September 2004 (27.09.2004)	
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Edan Orgad Telephone No. 703-305-4223	

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-5 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the claims:
pages NONE, as originally filed
pages 6-7, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the drawings:
pages 1-3 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
pages NONE as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/25876

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>1-10</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-10</u>	NO
Industrial Applicability (IA)	Claims <u>1-10</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-10 lack an inventive step under PCT Article 33(3) as being obvious over Barber et al (US 6,101,371) in view of Nguyen et al (US 6,236,281).

Regarding claims 1 and 7, Barber teaches modifying a radio frequency (RF) response, comprising: establishing an RF response in a signal path of a device (col. 3, lines 7-13). However, Barber fails to specifically disclose controlling an actuator to structurally alter the signal path and dynamically change an impedance of the signal path to alter the RF response. However, Nguyen teaches controlling an actuator to structurally alter the signal path and dynamically change an impedance of the signal path to alter the RF response (col. 2, lines 25-57). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include Nguyen's teachings with Barber in order to provide feedback techniques for precise control of the Q-factor of a micromechanical resonator. Furthermore, Nguyen fails to specifically disclose an undercut post processed actuator, however, it is well known in the art to use undercut post processed actuator. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an undercut post processing actuator in order to achieve a suspended beam of conductive material.

Regarding claim 2, Nguyen teaches modifying the RF response includes modifying at least one of the frequency, phase and amplitude of a signal received along the signal path (col. 12, lines 44-54).

Regarding claims 3 and 8, Nguyen teaches the actuator is a microelectromechanical system device (see abstract).

Regarding claim 4, Nguyen teaches the device is at least one of a filter, a phase shifter and an attenuator (col. 13, lines 10-23).

Regarding claim 5, Nguyen teaches the controlling to dynamically change an impedance occurs in response to an external excitation (col. 13, line 62-col. 14, line 4).

Regarding claim 9, Nguyen teaches the signal path is a segmented path having cascaded legs, wherein coupling coefficients of the cascaded legs are altered using the actuator (col. 16, lines 24-54).

Regarding claims 6 and 10, Barber teaches using undercut post CMOS processing to form the actuator, as a dynamically movable conductor (see abstract).

Response to arguments:

Regarding applicant's arguments with respect to claims 1 and 7, applicant has amended claims 1 and 7 to include the limitation of an undercut post processing actuator. Although this limitation does overcome the references at hand, Barber in view of Nguyen, it still does not render the claims novel because an undercut post processed actuator is well known in the art and therefore would have been an obvious modification to Nguyen to use an undercut post processing actuator in order to achieve a suspended beam of conductive material.

----- NEW CITATIONS -----

Amended claims**-6-****What is claimed is:**

1. (Amended) Method of modifying a radio frequency (RF) response, comprising:
establishing an RF response in a signal path of a device; and
controlling an undercut post processed actuator to structurally alter the signal path and dynamically change an impedance of the signal path to alter the RF response.
2. Method according to claim 1, wherein modifying the RF response includes modifying at least one of the frequency, phase and amplitude of a signal received along the signal path.
3. Method according to claim 1, wherein the actuator is a microelectromechanical system device.
4. Method according to claim 1, wherein the device is at least one of a filter, a phase shifter and an attenuator.
5. Method according to claim 1, wherein the controlling to dynamically change an impedance occurs in response to an external excitation.
6. Method according to claim 1, comprising:
using undercut post CMOS processing to form the actuator, as a dynamically movable conductor.
7. (Amended) An apparatus for modifying a radio frequency (RF) response comprising:
a signal path having an RF transfer function; and
an undercut post processed actuator for tuning the device by structurally changing the signal path to alter the RF transfer function.

8. Apparatus according to claim 7, wherein the actuator is a microelectromechanical system device.
9. Apparatus according to claim 7, wherein the signal path is a segmented path having cascaded legs, wherein coupling coefficients of the cascaded legs are altered using the actuator.
10. Apparatus according to claim 8, wherein the microelectromechanical system is a post machined section of a CMOS circuit.